

Amendments to the CLAIMS

1. (Canceled).
2. (Currently Amended): A magnetic sensor which detects a magnetic field comprising;

a magnetoresistance effect element comprising a spin valve film, the film comprising a free layer, a spacer layer and a pinned layer whose magnetization direction is pinned, wherein said layers are successively laminated on a substrate of a single chip, the substrate having a rectangular shape which has two sides along an X-axis and two sides along a Y-axis, the X-axis and the Y-axis being perpendicular to each other in a plan view, substantially square portion of a substrate of a chip, said magnetoresistance effect element having a resistance value that changes in accordance with a relative angle formed by the magnetization direction of the pinned layer and a magnetization direction of the free layer;

said magnetic sensor being formed in such a manner that a plurality of said magnetoresistance effect elements are provided on a single plane, the substrate said magnetoresistance effect elements are placed symmetrically with respect to center lines of the rectangular shape, one of the center lines is a center line of the two sides along the X-axis and perpendicular to the Y-axis and the other of the center lines is a center line of the two sides along the Y-axis and perpendicular to the X-axis, perpendicular center lines of the portion, and the pinned layers of at least two of said

plurality of magnetoresistance effect elements have the pinned magnetization directions that cross each other.

3. (Currently Amended): The magnetic sensor according to claim 2, wherein four of said plurality of magnetoresistance effect elements comprise a single axis magnetic sensor by full bridge connection of the four elements, the single axis magnetic sensor being an X-axis magnetic sensor for detecting a magnetic field along the X-axis or a Y-axis magnetic sensor for detecting a magnetic field along the Y-axis, said pinned magnetization directions of the pinned layers of the four elements being parallel to each other.
4. (Currently Amended): A magnetic sensor which detects a magnetic field comprising eight magnetoresistance effect elements including a first through an eighth element, each of said elements comprising a spin valve film, the film comprising a free layer, a spacer layer and a pinned layer, said pinned layer having a pinned magnetization direction, wherein said layers are successively laminated on a substrate of a single chip, the substrate having a rectangular shape which has a left side along a Y-axis, a right side along the Y-axis, a top side along an X-axis and a bottom side along the X-axis in a plan view, the X-axis and the Y-axis are perpendicular to each other, and each of the elements ~~wherein each element~~ has a resistance value that changes in accordance with a relative angle formed by a magnetization direction of said pinned layer and a magnetization direction of said free layer;

said magnetic sensor being formed in such a manner that said magnetoresistance effect elements are provided on a single plane, a substantially square portion of a substrate on a single chip, the portion having left, right, top and bottom sides, and perpendicular center lines on an X-axis and a Y-axis;

(a) said first element being formed at a position closer to the left side than the other sides and below a first center line of the top side and the bottom side, the first center line being perpendicular to the Y-axis, and said first element, in a lower left quadrant of the portion, below and near the Y-axis and near the left side, and having a pinned magnetization direction of said first element's pinned layer in a direction of the X-axis;

(b) said second element being formed at a position closer to the left side than the other sides and above the first center line, and said second element in an upper left quadrant of the portion, above and near the Y-axis and near the left side, and having a pinned magnetization direction of said second element's pinned layer in the direction of the X-axis;

(c) said third element being formed at a position closer to the right side than the other sides and above the first center line, and said third element in an upper right quadrant of the portion, above and near the Y-axis and near

~~the right side~~ and having a pinned magnetization direction of said third element's pinned layer in the direction of the X-axis;

(d) said fourth element being formed at a position closer to the right side than the other sides and below the first center line, and said fourth element ~~in a lower right quadrant of the portion, below and near the Y axis and near the right side,~~ and having a pinned magnetization direction of said fourth element's pinned layer in the direction of the X-axis;

(e) said fifth element being formed at a position closer to the top side than the other sides and left of a second center line of the left side and the right side, the second center line being perpendicular to the X-axis, and said fifth element ~~in the upper left quadrant of the portion, to the left of and near the X axis and near the top side,~~ and having a pinned magnetization direction of said fifth element's pinned layer in the direction of the Y-axis;

(f) said sixth element being formed at a position closer to the top side than the other sides and right of the second center line, and said sixth element ~~in the upper right quadrant of the portion, to the right of and near the X axis and near the top side,~~ and having a pinned magnetization direction of said sixth element's pinned layer in the direction of the Y-axis;

(g) said seventh element being formed at a position closed to the bottom side than the other sides and right of the second center line, and said seventh element in the lower right quadrant of the portion, to the right of and near the X-axis and near the bottom side, and having a pinned magnetization direction of said seventh element's pinned layer in the direction of the Y-axis; and

(h) said eighth element being formed at a position closer to the bottom side than the other sides and left of the second center line, and said eighth element in the lower left quadrant of the portion, to the left of and near the X-axis and near the bottom side, and having a pinned magnetization direction of said eighth element's pinned layer in the direction of the Y-axis.

5. (Currently Amended): The magnetic sensor according to claim 4 wherein:

(a) said first to fourth elements construct an X-axis magnetic sensor for detecting a magnetic field in the direction of the X-axis ~~an X-axis direction~~ by full bridge connection of the first to fourth elements; and

(b) said fifth to eighth elements construct a Y-axis magnetic sensor for detecting a magnetic field in the direction of the Y-axis ~~a Y-axis direction~~ by full bridge connection of the fifth to eighth elements.

6. (Previously presented): The magnetic sensor according to claim 5, wherein:
- (a) the pinned magnetization direction of the pinned layer of the first and the second elements are in a negative direction of the X-axis;
 - (b) the pinned magnetization direction of the pinned layer of the third and the fourth elements are in a positive direction of the X-axis;
 - (c) the pinned magnetization direction of the pinned layer of the fifth and the sixth elements are in a positive direction of the Y-axis; and
 - (d) the pinned magnetization direction of the pinned layer of the seventh and the eighth elements are in a negative direction of the Y-axis.
7. (Currently Amended): A magnetic sensor which detects a magnetic field comprising a plurality of magnetoresistance effect elements, each element comprising a spin valve film, the film comprising a free layer, a spacer layer and a pinned layer having a pinned magnetization direction, ~~said layers are successively laminated on a substrate of a chip, wherein~~ the element having ~~has~~ a resistance value that changes in accordance with a relative angle formed by a magnetization direction of the pinned layer and a magnetization direction of the free layer, ~~[[:]] wherein.~~

(a) said layers of each of the said magnetic sensor
~~is formed from~~ magnetoresistance effect elements are
successively that are laminated directly on a single substrate
of on a single chip;

(b) an X-axis group of four of a plurality of said
magnetoresistance effect elements constructs an constructing
a X-axis magnetic sensor for detecting a magnetic field in an
X-axis direction[[]] and all of said magnetoresistance effect
elements of the X-axis group have pinned magnetization
directions of the pinned layers parallel to each other, and

(c) a Y-axis group of four of a plurality said
magnetoresistance effect elements constructs constructing a
Y-axis magnetic sensor for detecting a magnetic field in a Y-
axis direction perpendicular to the X-axis[[]] direction and
all of said magnetoresistance effect elements of the Y-axis
group have pinned magnetization directions of the pinned
layers parallel to each other.

8. (Previously presented): The magnetic sensor according to
claim 7, wherein:

(a) said X-axis group of magnetoresistance effect
elements construct the X-axis magnetic sensor by full bridge
connection, and the pinned magnetization directions of the
X-axis group of magnetoresistance effect elements are in the
X-axis direction; and

(b) said Y-axis group of magnetoresistance effect elements construct the Y-axis magnetic sensor by full bridge connection, and the pinned magnetization directions of the Y-axis group of magnetoresistance effect elements are in the Y-axis direction.

9. (New): The magnetic sensor according to claim 2, wherein the substrate has a generally square shape as the rectangular shape.
10. (New): The magnetic sensor according to claim 2, wherein the substrate has a square shape as the rectangular shape.
11. (New): The magnetic sensor according to claim 3, wherein the substrate has a generally square shape as the rectangular shape.
12. (New): The magnetic sensor according to claim 3, wherein the substrate has a square shape as the rectangular shape.
13. (New): The magnetic sensor according to claim 4, wherein the substrate has a generally square shape as the rectangular shape.
14. (New): The magnetic sensor according to claim 4 wherein the substrate has a square shape as the rectangular shape.
15. (New): The magnetic sensor according to claim 5, wherein the substrate has a generally square shape as the rectangular shape.

16. (New): The magnetic sensor according to claim 5, wherein the substrate has a square shape as the rectangular shape.